KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2019/2020

SUPPLEMENTARY/SPECIAL EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

PPB 310: PHARMACOLOGY 1

DATE: FRIDAY 17TH JANUARY 2020 **TIME:** 9.00 A.M. - 12.00 P.M.

INSTRUCTIONS:

- This paper consists of three sections A, B, and C
- Answer all questions on the booklets provided
- Answer each section on a separate booklet

SECTION A: BASIC PRINCIPLES IN PHARMACOLOGY

1. Which statement best describes pharmacology?
   A. The study of chemotherapy or treatment of microbial infections
   B. The science of how drugs interact with biological systems
   C. The study of the selection of the most appropriate drug, dosage & duration of treatment for a particular disease
   D. The art & science of compounding & dispensing drugsfor administration of drugs to man or animals
   E. The collection, identification, purification, isolation, synthesis, standardization & quality control of medicinal substances

2. Which one is NOT a catalytic receptor?
   A. Interleukin 2 receptor
   B. Interferon receptor
   C. Erythropoietin receptor
   D. Epidermal growth factor receptor
   E. Insulin receptor

3. Which one is a non- steroid nuclear hormone receptor?
   A. Glucocorticoid receptor
   B. Insulin receptor
   C. Erythropoietin receptor
   D. Cytokine receptor
   E. Vitamin D receptor

4. Which statement BEST describes a drug's potency?
   A. Capacity to induce a functional change in the receptor
   B. Ability to induce a conformational change in a receptor
   C. Measure of how much of a drug is required to elicit a given response
   D. Maximal response produced by a drug once it has bound to its receptor
   E. Measure of how much of a drug is required to elicit a maximal response

5. Which statement BEST describes drug specificity?
   A. The range of actions produced by a drug
   B. Ability to bind with the receptor
   C. Capacity to induce a functional change in the receptor
   D. Capacity to occupy a receptor and block it
   E. Conformational change in a receptor

6. Which one is not a phase II drug metabolizing enzyme?
   A. N-acetyl transferase 2
   B. Uridine 5'-diphospho- (UDP) glucuronosyltransferase 1A1 (UGT1A1)
   C. Thiopurine S-Methyltransferase
   D. Sulfotransferase
   E. Dihydropyrimidine dehydrogenase

7. Which route of drug administration is associated with 100% bioavailability?
   A. Intravenous
   B. Oral
   C. Intraperitoneal
   D. Sublingual
   E. Rectal

8. Which drug has a low apparent volume of distribution?
   A. Digoxin
   B. Heparin
   C. Gentamicin
   D. Morphine
   E. Streptomycin

9. The half-life of a drug is influenced by.....
   A. Volume of distribution
   B. Bioavailability
   C. Disintegration
   D. Dissolution
   E. Dose

10. The knowledge of the pharmacokinetic properties of a drug is important for determining the following EXCEPT.....
   A. Duration of drug action
   B. Target of drug action
   C. Route of drug administration
   D. Dose of drug to administer
   E. Frequency of drug administration

11. Outline four factors that determine the bioavailability of a drug (2 marks)
12. Highlight four mechanisms of drug absorption from the gastrointestinal tract (2 marks)
13. State four examples of G-protein coupled receptors? (2 marks)
14. Outline four phase I drug metabolizing enzymes that are affected by pharmacogenetic polymorphisms (2 marks)
15. Highlight four types of steroid nuclear hormone receptors (2 marks)
16. List two types of catalytic receptors that contain an intracellular domain with intrinsic tyrosine kinase activity giving one example of a drug that acts on each of these receptors. (3 marks)
17. Describe four features of a type B adverse effect (2 marks)
18. State four advantages of intravenous route of drug administration (2 marks)
19. Define the following terms:
    a) Adverse drug effect (1 mark)
    b) Polymorphism (1 mark)
    c) Drug tolerance (1 mark)
20. Describe the following terms:
    a) Half-life (1 mark)
    b) Bioavailability (1 mark)
    c) Partial agonist (2 marks)
    d) Redistribution of a drug (6 marks

SECTION B: DRUG DEVELOPMENT

1. The statement that best describe clinical trial is.....
   A. set of procedures in medical research conducted to allow safety and efficacy data to be collected for health interventions
   B. Study that translate animal data parameters into some better ways that prevent, diagnose, or treat disease.
   C. process of setting primary questions and clinical end-points
   D. process of sampling health and sick population for drug efficacy and toxicity studies
   E. method of discovering new drugs

2. The first international document which advocated voluntary participation and informed consent is
   A. Nuremberg Code
   B. Declaration of Helsinki
   C. Belmont Report
   D. International Conference on Harmonisation E6 good clinical practice
   E. The World Health Organization guidelines for good clinical trials

3. Which of the following is NOT a key objective of good laboratory practice in drug development?
   A. Instrument validation
   B. Materials Certification
   C. Specimen/Sample Tracking
   D. Increase the business turnover
   E. Reduce costs of studies

4. The following are components of good clinical practice EXCEPT.....
   A. Qualified individual taking part in drug efficacy and toxicity studies
   B. The confidentiality of records
   C. Study protocols should be compliant with Declaration of Helsinki
   D. Approved protocols by institutional review board
   E. Investigational product compliant to good manufacturing practice

5. The main purpose of phase I clinical trial is to....
   A. select a lead compound from a lead series
   B. identify target population
   C. establish safety in human
   D. test whether the proposed drug actually works
   E. establish efficacy

6. During clinical studies, informed consent should include the following EXCEPT
   A. the details of the purpose of the experiment
   B. a description of the procedures
   C. the duration of the study
   D. the cost of the study
   E. the study personnel

7. The period, on average, between drug discovery and introduction to the market is
   A. 5 years
   B. 2 years
   C. 10 years
   D. 15 years
   E. 1 year

8. Which of the following is NOT deemed essential for a company sponsoring a candidate drug for a clinical trial?
   A. Ability to manufacture the candidate drug on large scale
   B. Clear patent position on chemical series
   C. Defined biomarkers readout for clinical evaluation
   D. Discernible efficacy in an appropriate *in vivo* model
   E. Obtaining regulatory approval by Pharmacy and Poisons Board.

9. Which of the following statements best describes a lead compound?
   A. A compound that contains the element lead
   B. A compound from the research laboratory that is chosen to go forward for preclinical and clinical trials
   C. A molecule that shows some activity or property of interest and serves as the starting point for the development of a drug.
   D. The first compound of a structural class of compounds to reach the market
   E. Compound isolated from herbal plants

10. The statement that **best** describes preclinical studies is...
   A. identification of possible human doses and side effects using appropriate animals' disease models
   B. a test on efficacy or safety on a new medical device carried out in a laboratory
   C. Development of surrogate markers for new drug in human studies
   D. Obtaining pharmacokinetic and pharmacodynamics data on Investigational New drug
   E. Developing new therapeutics agent from lead compound using combinatorial chemistry.

11. Describe three differences between the terms 'single' and 'repeat' dose toxicity studies as used in preclinical studies (6 marks)
12. Outline the stepwise investigational procedure for a new drug. (5 marks)
13. Compare and contrast phase II and III clinical trials. (5 marks)
14. As regards legislation pertaining to drug development;
    a) Describe their evolution and highlight key milestones and the underlying reasons using the Pure Food and Drug Act (1906) and Food, Drug & Cosmetic Act (1938). (11 marks)
    b) Outline three new requirements that were made mandatory when modern legislations were enacted starting 1962. (3 marks)

SECTION C: AUTOCOIDS, PAIN AND INFLAMMATION

1. Which one of the following statements concerning H_1 antihistamines is correct?
    A. Second-generation H_1 antihistamines are relatively free of adverse effects.
    B. they are the first choice for allergic rhinitis of the established long-term safety
    C. their use does not affect motor coordination
    D. They can be used in the treatment of acute anaphylaxis.
    E. Together with second-generation H_1 antihistamines, they readily penetrate the blood–brain barrier.

2. Which of the following drugs for headache is contraindicated in patients with peripheral vascular disease?
    A. Ergotamine.
    B. Aspirin.
    C. Acetaminophen.
    D. Naproxen
    E. Ibuprofen.

3. Which of the following drugs is useful in NSAID-induced gastrointestinal ulcerations?
    A. Celecoxib
    B. Cimetidine
    C. Diclofenac
    D. Diphenhydramine
    E. Misoprostol

4. The target enzymes that inhibits uric acid synthesis be in gouty arthritis is

A. 5'-Lipoxygenase

B. Cyclooxygenase 1

C. Cyclooxygenase 2

D. Phospholipase A2

E. Xanthine oxidase

5. Which of the following enzymes or processes is the main target of corticosteroids when they are given at pharmacologic (supraphysiologic) doses?

A. Cyclooxygenases (COX-1 and -2)

B. Histidine decarboxylase

C. 5'-lipoxygenase

D. Phospholipase A2

E. Xanthine oxidase

6. A new born has blood gas and hemodynamic problems because of a patent (open) ductus arteriosus. Which of the following drugs would be administered in an attempt to close the ductus?

A. Cimetidine

B. Diphenhydramine

C. Indomethacin

D. Misoprostol

E. Prostaglandin E_1

7. What was the reason for the withdrawal of rofecoxib?

A. Hepatotoxicity

B. Cardiotoxicity

C. Teratogenicity

D. Nephrotoxicity

E. Hypersensitivity

8. What is the site for histamine-one receptor sites?

A. Endothelium
B. b. Smooth muscle
C. c. Mast cell
D. d. Brain
E. d. Gastric mucosa

9. Significant antagonist activity at opioid receptors occurs with

A. Clonidine
B. Ketamine
C. Naloxone
D. Naproxen
E. Codeine

10. An 18-month-old boy dies from an accidental overdose of acetaminophen. Which of the following is the most likely cause of this patient's death?

A. Arrhythmia
B. Haemorrhagic stroke
C. Liver failure
D. pulmonary oedema
E. Ventilatory failure

11. Name FOUR disease-modifying antirheumatic drugs (DMARDs) and describe their mechanism of actions (8 marks)

12. Compare the pharmacological (pharmacodynamic and pharmacokinetic) effects aspirin and ibuprofen. (4 marks)

12. Describe the biosynthetic process of the following autacoids. (6 marks)

(i) Serotonin (ii) Histamine

13. List FOUR therapeutic uses of prostaglandins. (2 marks)

14. Describe the mechanism through which probenecid affects renal clearance of NSAIDs. (2 marks)

15. Match the receptor agonist/antagonist with the appropriate pharmacologic action: (4 marks)\

A. 5-HT1_A agonist	(i) Antiemetic
B. 5-HT1_D agonist	(ii) Anxiolytic
C. 5-HT3 antagonist	(iii) Antipsychotic
D. 5-HT2_A, antagonist	(iv) Acute migraine

16. Outline bradykinin mediation of acute inflammatory processes. (4 marks)